

[007] Compression downshifting is particularly of value in descents from mountains to take advantage of the braking torque of a vehicle motor so that, simultaneously, the operational brakes of the vehicle need not be too severely loaded. In addition, by way of a choice of transmission gearing, which is compliant with the actual speed, assurance is provided that at the termination of the ~~down-hill-downshifting~~ coasting phase, while the clutch is closed, the correct gear is found to be engaged, which will serve well for a continuing positive vehicle acceleration. ←

[009] On the account of the above, in the case of multi-stage, automatic transmissions, frequent downshifting while coasting into compliant speed related gear stages is not actually carried out, in the case of downshifting while running against motor compression. In order not to allow the high motor compression braking torque in the low gear stages to react adversely on the vehicle in such transmissions, compression downshifting into the smaller gears can only be permitted up to the time that a predetermined threshold vehicle speed has been attained. Below this speed limitation, the most recently engaged gear (most likely a high gear) is kept closed and the driving speed in this gear is further reduced by the closed clutch. ←

[016] BRIEF DESCRIPTION OF THE DRAWING ←

The sole figure shows the method of operating an automatic transmission of a motor vehicle, according to the present invention, having a clutch located between a drive motor and the transmission. ←

The invention bases itself on a method for the operation of an automatic transmission in a motor vehicle wherein, while a compression coasting operational phase is carried out until the reaching of a predetermined threshold speed, whereupon the phase is ended by closing the clutch. At speeds less than this threshold speed, however, an exclusion is placed on downshifting carried out with an open clutch so that the driving speed is established and/or that gear ←

stage is engaged, which is in accordance with the driving conditions at that particular time. Continuous travel with a positive driving torque can be achieved in the shortest possible time. The open clutch, related to the downshifting in speeds less than the predetermined threshold speed, additionally, assures no brake torque will be generated by the drive motor in spite of engaged low transmission gear stages which is, for example, an internal combustion machine.

[0018] Accordingly, counter to the state of the technology, below the stated threshold value for speed, additional downshifting can take place during coasting. In the case of these so-called comfort downshifts, however, the clutch is not closed after the engagement of a new gear, but is left in an open state. When this is done, the negative effect of the motor braking action being too strong, which is known to the state of the technology, does not occur. In this operation, the gear jumps were fortunately chosen with consideration given to the vehicle delay which, for example, is determined by the measurement of the change of the transmission output shaft speed of rotation. ←

[0025] In accordance with two other variations of the invention, it is possible that signals can be used as indicators for the determination of the driver's wish for a positive drive torque and also to initiate the termination of the ~~compression downshifting~~ coasting mode. Further, signals can be used to characterize the positioning for the activation levers of the direction of travel indicator and/or to compare an overstepping of the angle of the vehicle steering in relation to a predetermined angle of steering. ←

[0030] A further improvement of the operation of an automatic transmission is to be found therein, that the engagement of the starting gear of the automatic transmission at the end of a ~~compression operation phase~~ coasting mode is ←

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always ended with an open clutch, insofar as only this gear stage enables continuity of travel.